

## ABSTRACT OF THE DISCLOSURE

The adhesion of a capping layer, e.g., silicon nitride, to inlaid Cu is improved with an attendant reduction in hillock formation and, hence, improvement in electromigration resistance, by laser thermal annealing the exposed surface of the inlaid Cu after CMP to remove copper oxide therefrom. Embodiments include laser thermal annealing in  $\text{NH}_3$  or  $\text{H}_2$  at a temperature of about  $370^\circ$  to about  $420^\circ$  for a short period of time, e.g., about 10 to about 100 nanoseconds, to remove the copper oxide. Embodiments also include sequentially and contiguously laser thermal annealing the exposed planarized surface of inlaid Cu, ramping up the introduction of  $\text{SiH}_4$  and then initiating (PECVD) of a silicon nitride capping layer. Embodiments also include Cu dual damascene structures formed in dielectric material having a dielectric constant (k) less than about 3.9.

WDC99 465935-1 050432 0234

10079517.022202